

GRAPHING QUADRATIC FUNCTIONS by using TRANSFORMATIONS (by hand)

Recall: Vertex Form of a quadratic function:

$$f(x) = a(x - h)^2 + k$$

- stretches/compresses
- up or down

→ up/down .
← left/right

How to Sketch Graphs using Vertex Form:

1. Sketch the graph of $f(x) = x^2$.
2. Apply the transformations from *left to right* using the key points of $f(x) = x^2$; namely, the points $(-2, 4)$, $(-1, 1)$, the vertex $(0, 0)$, $(1, 1)$, $(2, 4)$:
 - Reflection in the x-axis
 - Vertical stretch / compression
 - Horizontal translation left or right
 - Vertical translation up or down

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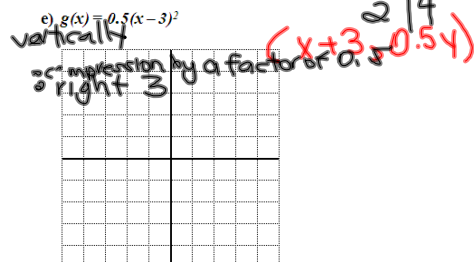
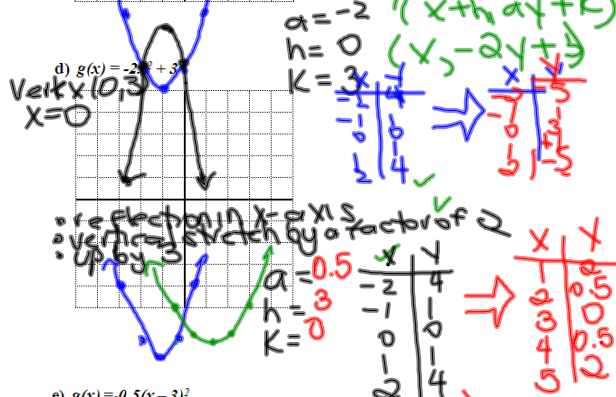
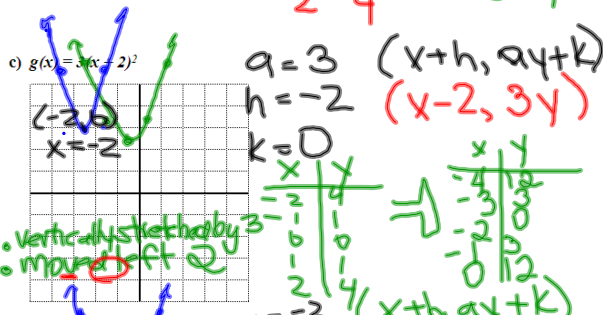
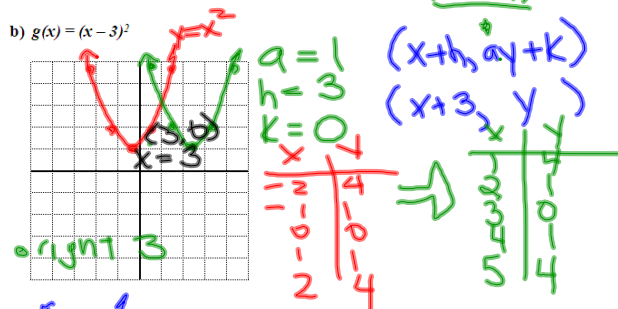
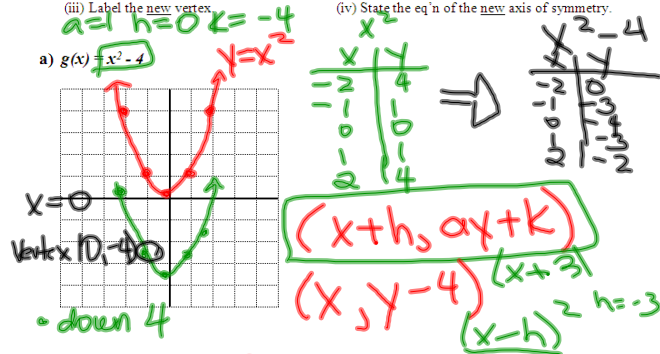
STEPS:

1. Sketch $f(x) = x^2$
2. For each transformation:
 - Define the new key points
 - Sketch and label parabola
3. Final graph:
 - Label vertex
 - State axis of symmetry

Examples: For each of the following quadratic functions:

- (i) State the transformations, in order.
 (iii) Label the new vertex.

- (ii) Sketch the transformation using key points.
 (iv) State the eq'n of the new axis of symmetry.



f) $g(x) = -\frac{1}{3}x^2 + 2$

